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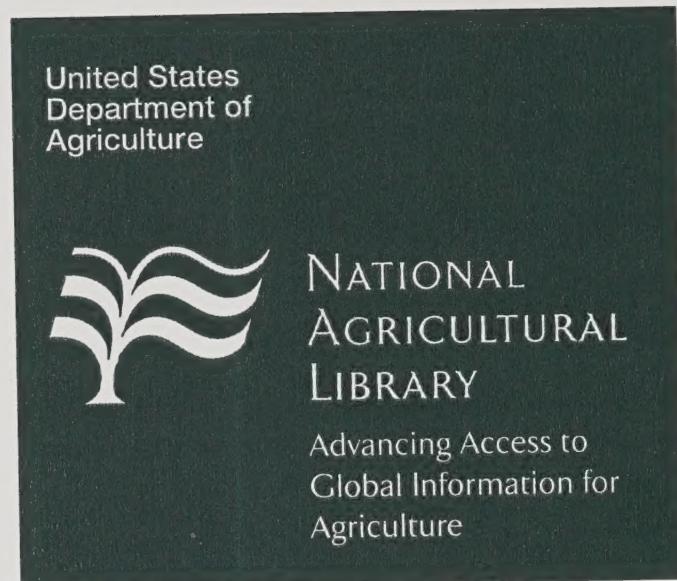
Wildlife Services

September 2007

VS

Sheep and Lamb Predator Death Loss in the United States, 2004





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Introduction

Each January, USDA's National Agricultural Statistics Service (NASS) collects sheep data on inventory, lamb crop, and total sheep and lamb death loss. Inventory and lamb crop estimates (number of head) are published in January via the Sheep and Goats report. Sheep and lamb death losses (number of head) are published in May via the Meat Animals Production, Disposition, and Income report. For NASS's January 1995, 2000, and 2005 sheep surveys, USDA's Animal and Plant Health Inspection Service (APHIS) provided funding for a detailed, retrospective breakdown of total sheep and lamb loss by producer-attributed cause of loss occurring during the previous year. Death losses by predator and nonpredator causes were published by NASS for losses in 2004 (NASS report "Sheep and Goats Death Loss," released May 6, 2005—www.nass.usda.gov).

This report provides a breakdown of sheep and lamb death losses in 2004 for all causes by size group and region, with special emphasis on predator causes of loss. Where possible, the 1994 and 1999 death losses are provided for comparison.

The methods used in the study can be found at the end of this report.

Further information on NAHMS studies and reports is available at:
<http://nahms.aphis.usda.gov>

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Terms Used In This Report

Adult sheep inventory: Breeding rams and ewes 1 year and older, and market sheep.

Lamb crop: For the Central, Northeast, and Southeast regions (see regions listed below), all lambs born alive during the calendar year. For the Pacific and West Central regions, all lambs after docking or branding during the calendar year.

Lambs: Animals less than 1 year old.

Lamb losses: For the Central, Northeast, and Southeast regions, lamb losses were tallied for all lambs born alive. In the Pacific and West Central regions, lamb losses were tallied for lambs after docking or branding. For a discussion of predocking losses, see Appendix.

Market sheep: Animals 1 year and older for use as feeders or for slaughter.

N/A: Not available.

Regions:

Pacific: California, Oregon, Washington

West Central: Arizona, Colorado, Idaho, Montana, New Mexico, Nevada, Texas, Utah, Wyoming

Central: Illinois, Indiana, Iowa, Kansas, Michigan, Minnesota, Missouri, Nebraska, North Dakota, Oklahoma, South Dakota, Wisconsin

Northeast: Connecticut, Maine, Massachusetts, New Hampshire, New York, Ohio, Pennsylvania, Rhode Island*, Virginia, Vermont, West Virginia

Southeast/Other: Alabama, Alaska, Arkansas, Delaware, Florida, Georgia, Hawaii, Kentucky, Louisiana, Maryland, Mississippi, New Jersey, North Carolina, South Carolina, Tennessee

*For the 1994 estimates, Rhode Island was included in the Southeast/Other region. In 1999 and 2004, Rhode Island was included in the Northeast region.

Size of Operation: Number of sheep and lambs on the operation January 1 of respective year. Size groups are: 1 to 24; 25 to 99; 100 to 999; and 1,000 head or more.

Section I: Population Estimates—Number of Head

A. U.S. Demographics*

1. Inventory, January 1, 1994 to 2005

Number of sheep and lambs by class and by year:

| Class | January 1 Number (1,000 Head) | | | | | | | | | | | |
|--|-------------------------------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| | Year | | | | | | | | | | | |
| | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 |
| All sheep and lambs | 9,835.7 | 8,989.3 | 8,464.6 | 8,023.7 | 7,825.1 | 7,247.0 | 7,036.0 | 6,908.0 | 6,623.0 | 6,321.0 | 6,105.0 | 6,135.0 |
| Breeding ewes 1 year and older | 5,844.4 | 5,403.6 | 5,134.3 | 4,911.6 | 4,569.5 | 4,336.0 | 4,234.0 | 4,071.0 | 3,939.0 | 3,773.0 | 3,609.5 | 3,572.5 |
| Breeding rams | 294.1 | 257.0 | 233.8 | 220.3 | 202.8 | 202.5 | 208.5 | 202.0 | 200.5 | 194.0 | 188.0 | 190.0 |
| Market sheep | N/A | 96.8 | 77.4 | 85.1 | 90.8 | 82.5 | 80.0 | 79.0 | 72.6 | 67.8 | 65.6 | 74.1 |
| Breeding ewes and rams 1 year and older and market sheep | N/A | 5,757.4 | 5,445.5 | 5,217.0 | 4,863.1 | 4,621.0 | 4,522.5 | 4,352.0 | 4,212.1 | 4,034.8 | 3,863.1 | 3,836.6 |

2. Operations—1994 to 2004

a. Number of operations with sheep and lambs by year:

| | Number Operations | | | | | | | | | | | |
|--|-------------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--|
| | Year | | | | | | | | | | | |
| | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | |
| | 86,060 | 79,900 | 76,600 | 72,680 | 71,750 | 70,000 | 69,200 | 68,600 | 68,150 | 67,720 | 67,580 | |

*"Sheep and Goats" annual January report, NASS

b. Percentage of operations with breeding sheep by size of operation and by year:

| Size of Operation (Number of Breeding Sheep) | Percent Operations | | | | | | | | | | |
|---|--------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| | Year | | | | | | | | | | |
| 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000* | 2001 | 2002 | 2003 | 2004 | |
| 1 to 99 | 89.6 | 91.2 | 90.9 | 91.9 | 90.8 | 90.6 | 91.2 | 90.8 | 91.1 | 91.8 | 92.2 |
| 100 to 499 | 8.2 | 6.7 | 7.0 | 6.2 | 6.8 | 7.3 | 7.2 | 7.5 | 7.3 | 6.7 | 6.3 |
| 500 to 4,999 | 2.1 | 2.0 | 2.0 | 1.8 | 2.3 | 2.0 | 1.6 | 1.6 | 1.5 | 1.4 | 1.4 |
| 5,000 or more | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 |
| Total | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.1 | 100.0 | 100.0 | 100.0 | 100.0 |

*Does not sum to 100.0 due to rounding

c. Percentage of breeding sheep inventory by size of operation and by year:

| Size of Operation (Number of Breeding Sheep) | Percent Inventory | | | | | | | | | | |
|---|-------------------|-------|-------|-------|-------|-------|------|-------|-------|-------|-------|
| | Year | | | | | | | | | | |
| 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000* | 2001 | 2002 | 2003 | 2004 | |
| 1 to 99 | 22.3 | 24.1 | 25.0 | 25.7 | 25.5 | 25.9 | 27.9 | 28.8 | 30.1 | 29.9 | 31.7 |
| 100 to 499 | 22.9 | 19.9 | 20.4 | 20.3 | 19.2 | 20.4 | 22.0 | 23.8 | 23.5 | 23.8 | 22.0 |
| 500 to 4,999 | 38.4 | 41.4 | 40.9 | 40.0 | 42.6 | 39.0 | 35.2 | 33.7 | 32.4 | 33.1 | 33.0 |
| 5,000 or more | 16.4 | 14.6 | 13.7 | 14.0 | 12.7 | 14.7 | 14.8 | 13.7 | 14.0 | 13.2 | 13.3 |
| Total | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 99.9 | 100.0 | 100.0 | 100.0 | 100.0 |

*Does not sum to 100.0 due to rounding

3. Lamb crop—1994 to 2004

Lamb crop and lamb crop per 100 ewes on hand, by year:

| | Year | | | | | | | | | | |
|--|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 |
| Lamb crop (1,000 Head) | 5,968.2 | 5,643.2 | 5,361.3 | 5,356.3 | 5,001.5 | 4,754.0 | 4,645.0 | 4,519.5 | 4,355.0 | 4,140.0 | 4,096.0 |
| Lamb crop per 100 ewes on hand beginning of year (January 1) | 102 | 104 | 104 | 109 | 109 | 110 | 110 | 111 | 111 | 110 | 113 |

B. Regional Demographics

For this report, the United States was divided into five regions (see Terms Used in This Report, p. 2) in order to provide data on smaller geographic areas. NASS does not publish inventory and death loss data for small sheep-producing States individually, but collapses the data into an “Other States” group. For estimates in this report, the Other States were combined with the Southeast region. About 4 percent of U.S. sheep and lamb death loss occurred in the Other States.

1. Adult sheep inventory—January 1, 1995, 2000, and 2005

Nationally, the sheep population declined from approximately 5.8 million head on January 1, 1995, to approximately 3.8 million head on January 1, 2005.

Regionally, only the Southeast/Other region showed an increase in sheep population from 1995 to 2005. A similar trend occurred in lamb-crop size during the same period (table 2)

Number of adult sheep (and number of adult sheep in 2005 as a percentage of adult sheep inventory in 1995 and 2000), by region:

| Region | January 1 Number (1,000 Head) | | | Percent | |
|-----------------|-------------------------------|---------|---------|------------------------------|------------------------------|
| | 1995 | 2000 | 2005 | 2005 as a percentage of 1995 | 2005 as a percentage of 2000 |
| Pacific | 740.0 | 506.5 | 447.2 | 60.4 | 88.3 |
| West Central | 3,237.0 | 2,547.0 | 1,974.0 | 61.0 | 77.5 |
| Central | 1,258.0 | 1,032.5 | 957.8 | 76.1 | 92.8 |
| Northeast | 400.0 | 309.5 | 314.9 | 78.7 | 101.7 |
| Southeast/Other | 122.4 | 127.0 | 142.7 | 116.6 | 112.4 |
| Total | 5,757.4 | 4,522.5 | 3,836.6 | 66.6 | 84.8 |

2. Lamb crop—1994, 1999, and 2004

Calendar year lamb crop (and 2004 lamb crop as a percentage of 1994 and 1999 lamb crops), by region:

| Region | Lamb Crop (1,000 Head) | | | Percent | |
|-----------------|------------------------|---------|---------|------------------------------|------------------------------|
| | 1994 | 1999 | 2004 | 2004 as a percentage of 1994 | 2004 as a percentage of 1999 |
| Pacific | 695.0 | 494.0 | 458.0 | 65.9 | 92.7 |
| West Central | 3,124.0 | 2,495.0 | 1,921.0 | 61.5 | 77.0 |
| Central | 1,574.0 | 1,298.0 | 1,227.0 | 78.0 | 94.5 |
| Northeast | 470.7 | 367.0 | 368.0 | 78.2 | 100.3 |
| Southeast/Other | 104.5 | 100.0 | 122.0 | 116.7 | 122.0 |
| Total | 5,968.2 | 4,754.0 | 4,096.0 | 68.6 | 86.2 |

C. U.S. Annual Death Loss

1. Loss from all causes, 1994–2004

A total of 385,000 lambs and 215,300 sheep were lost due to predator and nonpredator causes in 2004. These totals represent 9.4 and 5.6 percent of lamb crop and sheep inventory, respectively. While the sheep death loss percentage has remained relatively stable since 1994, the lamb death loss percentage declined steadily during the same period.

a. Sheep and lamb death loss due to all causes, by year:^{*}

| | Number (1,000 Head) | | | | | | | | | | | |
|-------|---------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|--|
| | Year | | | | | | | | | | | |
| | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | |
| Sheep | 332.8 | 314.4 | 342.6 | 305.4 | 297.0 | 259.8 | 281.5 | 274.7 | 261.7 | 238.4 | 215.3 | |
| Lambs | 614.7 | 580.4 | 578.8 | 542.8 | 507.1 | 488.6 | 490.2 | 474.8 | 428.8 | 393.8 | 385.0 | |
| Total | 947.5 | 894.8 | 921.4 | 848.2 | 804.1 | 748.4 | 771.7 | 749.5 | 690.5 | 632.2 | 600.3 | |

^{*}Meat Animal Production, Disposition, and Income, annual April report, NASS.

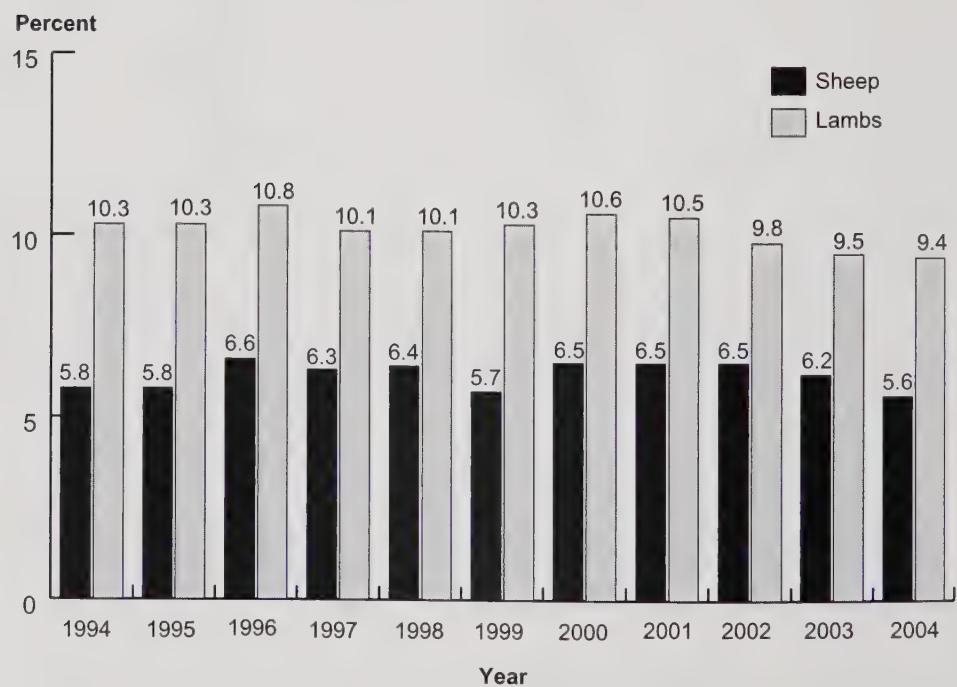
b. Sheep death loss as a percentage of January 1 inventory of adult sheep inventory on January 1 of the following year, by year:

| Percent Inventory | | | | | | | | | | | |
|-------------------|------|------|------|------|------|------|------|------|------|------|--|
| Year | | | | | | | | | | | |
| 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | |
| 5.8 | 5.8 | 6.6 | 6.3 | 6.4 | 5.7 | 6.5 | 6.5 | 6.5 | 6.2 | 5.6 | |

c. Lamb death loss as a percentage of lamb crop, by year:

| Percent Lamb Crop | | | | | | | | | | | |
|-------------------|------|------|------|------|------|------|------|------|------|------|--|
| Year | | | | | | | | | | | |
| 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | |
| 10.3 | 10.3 | 10.8 | 10.1 | 10.1 | 10.3 | 10.6 | 10.5 | 9.8 | 9.5 | 9.4 | |

Sheep Death Loss as a Percentage of January 1 Following-Year Adult Sheep Inventory, and Lamb Death Loss as a Percentage of Lamb Crop, by Year



2. U.S. nonpredator and predator death loss*—1994, 1999, and 2004

Since 1994, nonpredator causes have accounted for the majority of sheep and lamb death loss. In 2004, 62.7 percent of losses were due to nonpredator causes, while predator causes accounted for 37.3 percent.

a. Number of sheep and lamb death losses by cause and percentage of loss by cause—by year:

| Cause | Number and Percent Loss | | | | | | | |
|-------------|-------------------------|---------|---------|---------|---------|---------|--------|---------|
| | 1994 | | | | 1999 | | | |
| | Number | Percent | Number | Percent | Number | Percent | Number | Percent |
| Nonpredator | 577,950 | 61.1 | 472,700 | 63.2 | 376,100 | 62.7 | | |
| Predator | 368,050 | 38.9 | 275,700 | 36.8 | 224,200 | 37.3 | | |
| Total | 946,000 | 100.0 | 748,400 | 100.0 | 600,300 | 100.0 | | |

*Total sheep and lamb death losses for 1994 have been revised, although the revisions are not shown further in this publication since detailed cause-of-loss estimates were not similarly adjusted and republished. Sheep losses were revised from 336.6 to 332.8 (thousand head), and lamb losses were revised from 609.4 to 614.7; as a result, total losses were revised from 946.0 to 947.5 thousand head. Total sheep and lamb death losses for 1999 were revised from 260,900 to 259,800 sheep lost and from 482,000 to 488,600 lambs lost. Since the predator loss publication was not reissued, adjustments (reflecting the revised total sheep and total lamb losses) were made appropriately to the nonpredator loss category.

b. Number of sheep death losses by cause and percentage of loss by cause—by year:

| Cause | Number and Percent Loss | | | | | | | |
|-------------|-------------------------|---------|---------|---------|---------|---------|--------|---------|
| | 1994 | | | | 1999 | | | |
| | Number | Percent | Number | Percent | Number | Percent | Number | Percent |
| Nonpredator | 230,025 | 68.3 | 183,400 | 70.6 | 148,900 | 69.2 | | |
| Predator | 106,575 | 31.7 | 76,400* | 29.4 | 66,400 | 30.8 | | |
| Total | 336,600 | 100.0 | 259,800 | 100.0 | 215,300 | 100.0 | | |

*Initial NASS publication showed predator sheep losses of 77,000 head. Subsequent publication only revised total sheep loss. Relationship between predator and nonpredator loss was maintained at the State level, therefore deriving 76,400 head lost due to predators in the United States.

As in 1994 and 1999, a higher percentage of lamb losses (41.0 percent) than sheep losses (30.8 percent) was due to predators in 2004.

c. Number of lamb death losses by cause and percentage of loss by cause—by year:

| Cause | Number and Percent Loss | | | | Year | |
|-------------|-------------------------|---------|----------|---------|---------|---------|
| | 1994 | | 1999 | | 2004 | |
| | Number | Percent | Number | Percent | Number | Percent |
| Nonpredator | 347,925 | 57.1 | 289,300 | 59.2 | 227,200 | 59.0 |
| Predator | 261,475 | 42.9 | 199,300* | 40.8 | 157,800 | 41.0 |
| Total | 609,400 | 100.0 | 488,600 | 100.0 | 385,000 | 100.0 |

*Initial NASS publication showed predator lamb losses of 196,000 head. Subsequent publication only revised total lamb loss. Relationship between predator and nonpredator loss was maintained at the State level, therefore deriving 199,300 head lost due to predators in the United States.

3. Regional predator and nonpredator death loss—1994, 1999, and 2004

Total sheep losses declined from 1994 to 2004 in every region except the Southeast/Other. This decline probably reflects regional population changes, since the percentage of sheep inventory lost has remained stable. In every region, nonpredator losses of sheep were higher than predator losses. For the West Central region in 2004, 41,500 sheep (39.2 percent of all sheep losses) were lost to predators, compared to the Central region where only 9,300 sheep (17.5 percent of all sheep losses) were lost to predators. Surprisingly, the Southeast/Other region encountered a relatively high percentage of losses due to predators (34.0 percent). Note that for the Pacific and West Central regions, losses that occurred before docking were not included in the estimates; for the other regions, losses before docking were included in the estimates. While difficult to measure accurately, these losses may account for a substantial portion of total losses. For discussion of predocking losses, see Appendix.

a. Number of sheep death losses by cause and percentage of loss by cause—by region and by year:

| Region | Cause | Number and Percent Loss | | | | | |
|---------------------|-------------|-------------------------|---------|---------|---------|---------|---------|
| | | Year | | | | | |
| | | 1994 | 1999 | 2004 | | | |
| Region | Cause | Number | Percent | Number | Percent | Number | Percent |
| Pacific | Nonpredator | 25,625 | 64.1 | 17,700 | 61.0 | 18,300 | 70.4 |
| | Predator | 14,375 | 35.9 | 11,300 | 39.0 | 7,700 | 29.6 |
| | Total | 40,000 | 100.0 | 29,000 | 100.0 | 26,000 | 100.0 |
| West Central | Nonpredator | 116,325 | 62.2 | 87,500 | 66.8 | 64,500 | 60.8 |
| | Predator | 70,675 | 37.8 | 43,500 | 33.2 | 41,500 | 39.2 |
| | Total | 187,000 | 100.0 | 131,000 | 100.0 | 106,000 | 100.0 |
| Central | Nonpredator | 59,800 | 83.2 | 54,900 | 81.9 | 43,700 | 82.5 |
| | Predator | 12,100 | 16.8 | 12,100 | 18.1 | 9,300 | 17.5 |
| | Total | 71,900 | 100.0 | 67,000 | 100.0 | 53,000 | 100.0 |
| Northeast | Nonpredator | 21,875 | 76.1 | 15,900 | 80.3 | 15,600 | 78.0 |
| | Predator | 6,875 | 23.9 | 3,900 | 19.7 | 4,400 | 22.0 |
| | Total | 28,750 | 100.0 | 19,800 | 100.0 | 20,000 | 100.0 |
| Southeast/ Other | Nonpredator | 6,400 | 71.5 | 7,400 | 56.9 | 6,800 | 66.0 |
| | Predator | 2,550 | 28.5 | 5,600 | 43.1 | 3,500 | 34.0 |
| | Total | 8,950 | 100.0 | 13,000 | 100.0 | 10,300 | 100.0 |

In the Pacific and West Central regions, the percentage of loss due to predators was higher for lambs (67.6 and 66.7 percent, respectively) than for sheep (29.6 and 39.2 percent respectively) (table 3.a). The percentages of predator and nonpredator sheep losses in these regions (approximately one-third predator and two-thirds nonpredator) are nearly reversed for lamb losses (approximately two-thirds predator and one-third nonpredator). The highest percentages of lamb loss due to nonpredator causes occurred in the Central and Northeast regions (84.1 and 80.5 percent, respectively).

b. Number of lamb death losses by cause and percentage of loss by cause—by region and by year:

| Region | Cause | Number and Percent Loss | | | | | |
|---------------------|-------------|-------------------------|---------|---------|---------|---------|---------|
| | | Year | | | | | |
| | | 1994 | | 1999 | | 2004 | |
| Region | Cause | Number | Percent | Number | Percent | Number | Percent |
| Pacific | Nonpredator | 18,825 | 39.2 | 11,200 | 37.3 | 6,800 | 32.4 |
| | Predator | 29,175 | 60.8 | 18,800 | 62.7 | 14,200 | 67.6 |
| | Total | 48,000 | 100.0 | 30,000 | 100.0 | 21,000 | 100.0 |
| West Central | Nonpredator | 108,525 | 36.9 | 97,300 | 42.1 | 53,000 | 33.3 |
| | Predator | 185,475 | 63.1 | 133,700 | 57.9 | 106,000 | 66.7 |
| | Total | 294,000 | 100.0 | 231,000 | 100.0 | 159,000 | 100.0 |
| Central | Nonpredator | 156,175 | 83.7 | 132,700 | 81.2 | 117,300 | 84.1 |
| | Predator | 30,525 | 16.3 | 30,800 | 18.8 | 22,200 | 15.9 |
| | Total | 186,700 | 100.0 | 163,500 | 100.0 | 139,500 | 100.0 |
| Northeast | Nonpredator | 50,000 | 81.9 | 35,700 | 81.0 | 36,300 | 80.5 |
| | Predator | 11,050 | 18.1 | 8,400 | 19.0 | 8,800 | 19.5 |
| | Total | 61,050 | 100.0 | 44,100 | 100.0 | 45,100 | 100.0 |
| Southeast/ Other | Nonpredator | 14,400 | 73.3 | 12,400 | 62.0 | 13,800 | 67.6 |
| | Predator | 5,250 | 26.7 | 7,600 | 38.0 | 6,600 | 32.4 |
| | Total | 19,650 | 100.0 | 20,000 | 100.0 | 20,400 | 100.0 |

Section II: Population Estimates—Predator Losses

A. Sheep Predator Death Loss

1. Losses—2004

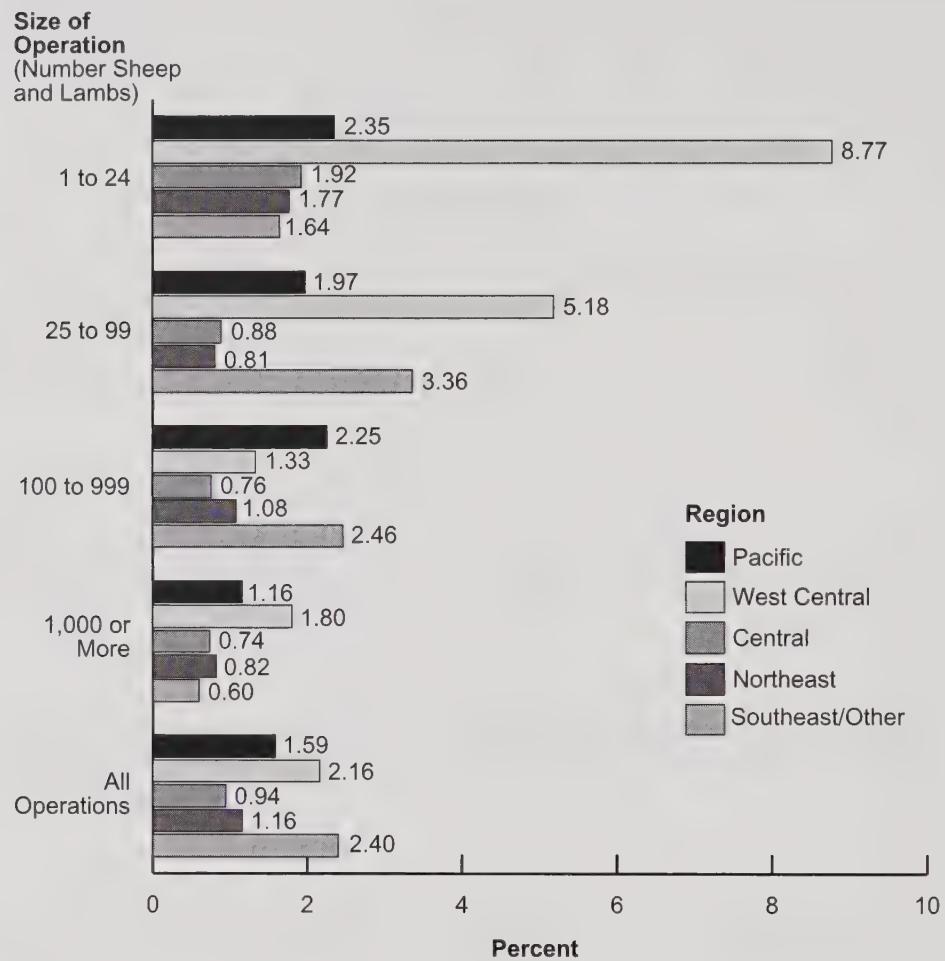
The percentage of sheep inventory lost to predators was consistently higher on operations with 1 to 24 sheep and lambs than on operations with 1,000 or more sheep and lambs. Across size categories, predator losses in the Central region (0.94 percent) were significantly lower than in all other regions, except the Northeast region.

Sheep death loss as a percentage of adult sheep inventory on January 1, 2005, by size of operation and by region:^{*}

| Region | Percent Inventory | | | | | | | | | |
|---------------------|---|------------|-------|------------|---------|------------|---------------|------------|----------------|------------|
| | Size of Operation (Number of Sheep and Lambs) | | | | | | | | | |
| | 1-24 | | 25-99 | | 100-999 | | 1,000 or More | | All Operations | |
| Region | Pct. | Std. Error | Pct. | Std. Error | Pct. | Std. Error | Pct. | Std. Error | Pct. | Std. Error |
| Pacific | 2.35 | (0.66) | 1.97 | (0.52) | 2.25 | (0.43) | 1.16 | (0.17) | 1.59 | (0.17) |
| West Central | 8.77 | (2.90) | 5.18 | (2.47) | 1.33 | (0.11) | 1.80 | (0.09) | 2.16 | (0.26) |
| Central | 1.92 | (0.53) | 0.88 | (0.25) | 0.76 | (0.08) | 0.74 | (0.12) | 0.94 | (0.10) |
| Northeast | 1.77 | (0.88) | 0.81 | (0.20) | 1.08 | (0.17) | 0.82 | (0.23) | 1.16 | (0.28) |
| Southeast/ Other | 1.64 | (0.61) | 3.36 | (1.15) | 2.46 | (0.80) | ** | | 2.40 | (0.49) |
| All operations | 3.06 | (0.60) | 2.02 | (0.53) | 1.21 | (0.08) | 1.61 | (0.07) | 1.73 | (0.14) |

*2004 predator death loss divided by the January 1, 2005, inventory of ewes and rams for breeding 1 year or older plus market sheep.

**Sample size <5.

Sheep Death Loss as a Percentage of Adult Sheep Inventory on January 1, 2005, by Size of Operation and by Region

2. Cause of loss—1994, 1999, and 2004

Coyotes were the leading cause of predator loss in 2004, accounting for 51.7 percent of sheep deaths due to predators. Dogs were the second leading cause of loss, accounting for 22.7 percent of predator losses. Losses due to “other” predators increased from 1994 to 2004.

a. Percentage of sheep death loss by cause and by year:

| Predator Cause | Percent Predator Loss | | |
|--|-----------------------|-------|-------|
| | 1994 | 1999* | 2004 |
| Bears | 4.3 | 4.6 | 4.5 |
| Bobcats or lynx | 2.7 | 3.0 | 3.3 |
| Coyotes | 58.5 | 51.7 | 51.7 |
| Dogs | 18.4 | 25.7 | 22.7 |
| Mountain lions** | 10.7 | 7.6 | 7.7 |
| Foxes | 0.8 | 0.9 | 0.5 |
| Eagles | 1.8 | 1.0 | 1.1 |
| Other predators (wolves, ravens, vultures, other animals, and unknown predators) | 2.8 | 5.3 | 8.6 |
| Total | 100.0 | 99.8 | 100.0 |

* Does not sum to 100.0 due to rounding.

**Also known as cougars, pumas, and panthers.

In 2004, 1.73 percent of the January 1, 2005, adult sheep inventory was lost to predators, which is similar to the percentage lost in 1999.

b. Percentage of January 1 following-year adult sheep inventory lost, by cause and by year:

| Predator Cause | Percent Inventory | | |
|--|--------------------------|-------------|-------------|
| | 1994 | 1999 | 2004 |
| Bears | 0.08 | 0.08 | 0.08 |
| Bobcats or lynx | 0.05 | 0.05 | 0.06 |
| Coyotes | 1.08 | 0.88 | 0.89 |
| Dogs | 0.34 | 0.44 | 0.39 |
| Mountain lions | 0.20 | 0.13 | 0.13 |
| Foxes | 0.01 | 0.02 | 0.01 |
| Eagles | 0.03 | 0.02 | 0.02 |
| Other predators (wolves, ravens, vultures, other animals, and unknown predators) | 0.05 | 0.09 | 0.15 |
| All predator causes | 1.84 | 1.71 | 1.73 |

*Unknown predators were included in "Other predators" in 2004.

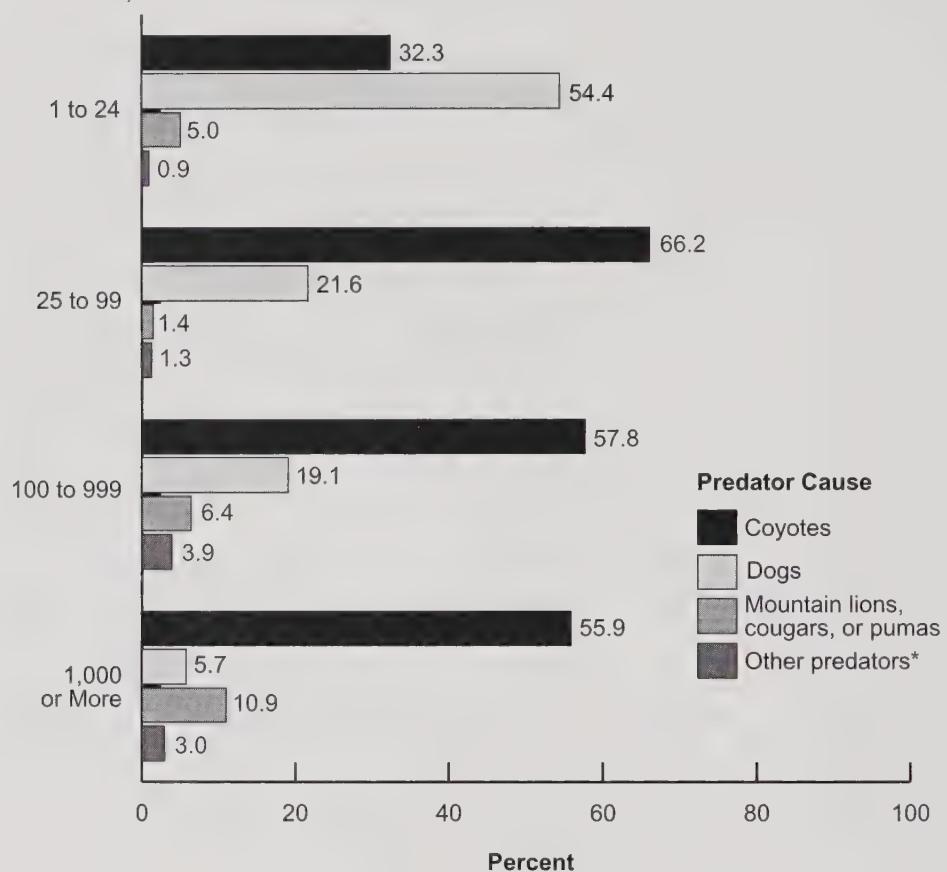
3. Cause of loss by size of operation—2004

The percentage of sheep death loss due to coyotes was lower in the smallest operation size category than in the larger size categories. The percentage attributable to dogs decreased as operation size increased.

a. Percentage of sheep death loss by cause and by size of operation:

| Predator Cause | Percent Predator Loss | | | | | | | |
|---|---|------------|-------|------------|---------|------------|---------------|------------|
| | Size of Operation (Number of Sheep and Lambs) | | | | | | | |
| | 1-24 | | 25-99 | | 100-999 | | 1,000 or More | |
| Predator Cause | Pct. | Std. Error | Pct. | Std. Error | Pct. | Std. Error | Pct. | Std. Error |
| Bears | 0.6 | (0.5) | 1.4 | (0.5) | 2.8 | (0.5) | 8.4 | (0.7) |
| Bobcats or lynx | 2.7 | (2.2) | 0.7 | (0.6) | 3.4 | (1.0) | 5.8 | (0.6) |
| Coyotes | 32.3 | (7.4) | 66.2 | (7.1) | 57.8 | (4.1) | 55.9 | (1.5) |
| Dogs | 54.4 | (8.7) | 21.6 | (4.5) | 19.1 | (5.1) | 5.7 | (0.7) |
| Mountain lions* | 5.0 | (1.9) | 1.4 | (0.5) | 6.4 | (1.3) | 10.9 | (0.8) |
| Foxes | 0.0 | (0.0) | 0.0 | (0.0) | 0.2 | (0.1) | 0.8 | (0.3) |
| Eagles | 0.0 | (0.0) | 0.3 | (0.3) | 0.4 | (0.2) | 2.2 | (0.3) |
| Other predators (incl. wolves, ravens, vultures, and other animals) | 0.9 | (0.5) | 1.3 | (0.6) | 3.9 | (0.8) | 3.0 | (0.5) |
| Unknown predators | 4.1 | (1.8) | 7.1 | (2.8) | 6.0 | (1.1) | 7.3 | (1.3) |
| Total | 100.0 | | 100.0 | | 100.0 | | 100.0 | |

*Also known as cougars, pumas, and panthers.

Percentage of Sheep Death Loss by Cause and by Size of Operation**Size of Operation**(Number of Sheep
and Lambs)

*Wolves, ravens, vultures, and other animals.

b. Percentage of January 1 following-year adult sheep inventory lost, by cause and by size of operation:

| Predator Cause | Percent of Inventory | | | | | | | |
|---|--|-------------------|--------------|-------------------|----------------|-------------------|----------------------|-------------------|
| | Size of Operation (Number of Sheep and Lambs) | | | | | | | |
| | 1-24 | | 25-99 | | 100-999 | | 1,000 or More | |
| Predator Cause | Pct. | Std. Error | Pct. | Std. Error | Pct. | Std. Error | Pct. | Std. Error |
| Bears | 0.02 | (0.01) | 0.03 | (0.01) | 0.03 | (0.01) | 0.13 | (0.01) |
| Bobcats or lynx | 0.08 | (0.07) | 0.01 | (0.01) | 0.04 | (0.01) | 0.09 | (0.01) |
| Coyotes | 0.99 | (0.25) | 1.34 | (0.47) | 0.70 | (0.05) | 0.90 | (0.05) |
| Dogs | 1.66 | (0.51) | 0.44 | (0.10) | 0.23 | (0.07) | 0.09 | (0.01) |
| Mountain lions | 0.15 | (0.05) | 0.03 | (0.01) | 0.08 | (0.02) | 0.17 | (0.02) |
| Foxes | 0.00 | (0.00) | 0.00 | (0.00) | 0.00 | (0.00) | 0.01 | (0.00) |
| Eagles | 0.00 | (0.00) | 0.01 | (0.00) | 0.01 | (0.00) | 0.04 | (0.00) |
| Other predators (incl. wolves, ravens, vultures, and other animals) | 0.03 | (0.01) | 0.03 | (0.01) | 0.05 | (0.01) | 0.05 | (0.01) |
| Unknown predators | 0.13 | (0.05) | 0.14 | (0.05) | 0.07 | (0.01) | 0.12 | (0.02) |
| All predator causes | 3.06 | (0.60) | 2.02 | (0.53) | 1.21 | (0.08) | 1.61 | (0.07) |

4. Cause of loss by region—2004

Coyotes accounted for the highest percentage of losses in every region except the Southeast/Other region, where dogs accounted for the highest percentage of predator loss.

a. Percentage of sheep death loss by cause and by region:

| Predator Cause | Percent Predator Loss | | | | | | | | | |
|---|-----------------------|------------|--------------|------------|---------|------------|-----------|------------|-----------------|------------|
| | Pacific | | West Central | | Central | | Northeast | | Southeast/Other | |
| | Pct. | Std. Error | Pct. | Std. Error | Pct. | Std. Error | Pct. | Std. Error | Pct. | Std. Error |
| Bears | 1.7 | (0.5) | 6.0 | (0.8) | 0.0 | (0.0) | 1.9 | (1.0) | 1.4 | (1.3) |
| Bobcats or lynx | 0.3 | (0.2) | 4.9 | (0.8) | 2.9 | (2.7) | 0.2 | (0.1) | 1.1 | (1.1) |
| Coyotes | 51.7 | (3.9) | 56.1 | (2.7) | 57.0 | (5.3) | 66.2 | (6.6) | 21.0 | (7.8) |
| Dogs | 15.5 | (3.1) | 16.0 | (3.1) | 31.7 | (5.2) | 27.5 | (6.8) | 52.4 | (12.5) |
| Mountain lions* | 14.0 | (2.3) | 7.2 | (1.1) | 2.7 | (0.9) | 0.1 | (0.1) | 3.3 | (3.3) |
| Foxes | 0.0 | (0.0) | 0.6 | (0.2) | 0.0 | (0.0) | 0.2 | (0.1) | 0.0 | (0.0) |
| Eagles | 0.0 | (0.0) | 1.5 | (0.3) | 0.5 | (0.4) | 0.0 | (0.0) | 0.0 | (0.0) |
| Other predators (incl. wolves, ravens, vultures, and other animals) | 0.9 | (0.4) | 2.7 | (0.5) | 1.4 | (0.7) | 1.2 | (0.9) | 6.6 | (2.2) |
| Unknown predators | 15.9 | (4.7) | 5.0 | (0.8) | 3.8 | (0.8) | 2.7 | (1.1) | 14.2 | (6.9) |
| Total | 100.0 | | 100.0 | | 100.0 | | 100.0 | | 100.0 | |

*Also known as cougars, pumas, and panthers.

b. Percentage of January 1 following-year adult sheep inventory lost, by cause and by region:

| Predator Cause | Percent Inventory | | | | | |
|---|-------------------|--------------|-------------|-------------|-------------|-------|
| | Region | | | | | |
| | Pacific | West Central | Central | Northeast | Southeast | Other |
| Bears | 0.03 (0.01) | 0.13 (0.01) | 0.00 (0.00) | 0.02 (0.01) | 0.03 (0.03) | |
| Bobcats or lynx | 0.01 (0.00) | 0.11 (0.01) | 0.03 (0.03) | 0.00 (0.00) | 0.03 (0.03) | |
| Coyotes | 0.82 (0.09) | 1.21 (0.18) | 0.54 (0.07) | 0.77 (0.20) | 0.50 (0.20) | |
| Dogs | 0.25 (0.05) | 0.34 (0.10) | 0.30 (0.06) | 0.32 (0.12) | 1.26 (0.46) | |
| Mountain lions | 0.22 (0.05) | 0.16 (0.02) | 0.03 (0.01) | 0.00 (0.00) | 0.08 (0.08) | |
| Foxes | 0.00 (0.00) | 0.01 (0.00) | 0.00 (0.00) | 0.00 (0.00) | 0.00 (0.00) | |
| Eagles | 0.00 (0.00) | 0.03 (0.00) | 0.00 (0.00) | 0.00 (0.00) | 0.00 (0.00) | |
| Other predators (incl. wolves, ravens, vultures, and other animals) | 0.02 (0.01) | 0.06 (0.01) | 0.01 (0.01) | 0.01 (0.01) | 0.16 (0.03) | |
| Unknown predators | 0.25 (0.09) | 0.11 (0.01) | 0.04 (0.01) | 0.03 (0.01) | 0.34 (0.17) | |
| All predator causes | 1.59 (0.17) | 2.16 (0.26) | 0.94 (0.10) | 1.16 (0.28) | 2.40 (0.49) | |

**B. Lamb Predator
Death Loss**

1. Losses—2004

In the West Central region, 5.22 percent of all lambs born were lost to predators in 2004. The Central region had the lowest percentage death loss due to predators (1.57 percent of lamb crop). Generally, differences in death loss across operation sizes were not statistically significant.

Percentage of lamb crop lost by size of operation and by region:

| Region | Percent Lamb Crop | | | | | | | | | | |
|---------------------|---|-------------|-------------|---------------|----------------|-----------|------------|-----------|------------|-----------|------------|
| | Size of Operation (Number of Sheep and Lambs) | | | | | | | | | | |
| | 1-24 | 25-99 | 100-999 | 1,000 or More | All Operations | Std. Pct. | Std. Error | Std. Pct. | Std. Error | Std. Pct. | Std. Error |
| Pacific | 4.65 (1.53) | 3.32 (0.70) | 3.51 (0.30) | 2.44 (0.31) | 2.98 (0.26) | | | | | | |
| West Central | 12.14 (3.20) | 6.28 (1.61) | 5.24 (0.50) | 4.76 (0.13) | 5.22 (0.22) | | | | | | |
| Central | 2.26 (0.52) | 1.28 (0.21) | 1.60 (0.16) | 1.55 (0.11) | 1.57 (0.12) | | | | | | |
| Northeast | 2.53 (0.96) | 2.66 (0.54) | 2.47 (0.29) | 2.32 (0.54) | 2.56 (0.33) | | | | | | |
| Southeast/ Other | 6.12 (1.97) | 4.85 (1.33) | 2.50 (1.19) | * | 4.68 (1.06) | | | | | | |
| All operations | 4.43 (0.65) | 2.70 (0.32) | 3.22 (0.22) | 4.18 (0.11) | 3.86** (0.12) | | | | | | |

*Small sample size (<5)

**Rounded up to match published NASS number

2. Cause of loss—1994, 1999, and 2004

Coyotes accounted for the highest percentages of death loss in lambs in 1994, 1999, and 2004 (69.4, 64.3, 64.2 percent of total predator loss, respectively).

a. Percentage of lamb death loss by cause and by year:

| Predator Cause | Percent Predator Loss | | |
|--|-----------------------|-------|-------|
| | *1994 | 1999 | *2004 |
| Bears | 2.9 | 2.1 | 3.5 |
| Bobcats or lynx | 2.4 | 5.3 | 5.6 |
| Coyotes | 69.4 | 64.3 | 64.2 |
| Dogs | 7.9 | 11.0 | 9.3 |
| Mountain lions** | 6.5 | 4.9 | 4.8 |
| Foxes | 4.4 | 3.8 | 2.5 |
| Eagles | 5.0 | 5.1 | 3.5 |
| Other predators (wolves, ravens, vultures, other animals, and unknown predators) | 1.4 | 3.5 | 6.5 |
| Total | 99.9 | 100.0 | 99.9 |

*Does not sum to 100.0 due to rounding.

**Also known as cougars, pumas, and panthers.

In 2004, 3.86 percent of all lambs born were lost to predators. Coyotes accounted for the loss of 2.47 percent of all lambs born in 2004.

b. Percentage of lamb crop lost by cause and by year:

| Predator Cause | Percent Lamb Crop | | | |
|--|--------------------------|-------------|-------------|-------------|
| | Year | 1994 | 1999 | 2004 |
| Bears | | 0.13 | 0.09 | 0.13 |
| Bobcats or lynx | | 0.11 | 0.22 | 0.22 |
| Coyotes | | 3.04 | 2.65 | 2.47 |
| Dogs | | 0.35 | 0.45 | 0.36 |
| Mountain lions | | 0.29 | 0.20 | 0.19 |
| Foxes | | 0.19 | 0.16 | 0.10 |
| Eagles | | 0.22 | 0.21 | 0.14 |
| Other predators (wolves, ravens, vultures, other animals, and unknown predators) | | 0.06 | 0.15 | 0.25 |
| All predator causes | | 4.39 | 4.13 | 3.86 |

3. Cause of loss by size of operation—2004

The percentages of lamb death loss due to coyotes were similar across operation sizes. However, the percentages of predator losses attributable to dogs ranged from 29.2 percent on operations with 1 to 24 sheep and lambs to 2.1 percent on operations with 1,000 or more sheep and lambs.

a. Percentage of lamb death loss by cause and by size of operation:

| Predator Cause | Percent Predator Loss | | | | | | | |
|--|---|------------|-------|------------|---------|------------|---------------|------------|
| | Size of Operation (Number of Sheep and Lambs) | | | | | | | |
| | 1-24 | | 25-99 | | 100-999 | | 1,000 or More | |
| Predator Cause | Pct. | Std. Error | Pct. | Std. Error | Pct. | Std. Error | Pct. | Std. Error |
| Bears | 0.0 | (0.0) | 1.2 | (0.4) | 0.9 | (0.2) | 7.0 | (0.5) |
| Bobcats or lynx | 1.5 | (1.2) | 2.1 | (0.7) | 6.0 | (0.8) | 8.5 | (0.5) |
| Coyotes | 55.7 | (6.9) | 66.9 | (3.6) | 66.5 | (1.6) | 58.6 | (1.0) |
| Dogs | 29.2 | (6.2) | 19.9 | (3.4) | 7.3 | (1.3) | 2.1 | (0.4) |
| Mountain lions* | 2.6 | (1.4) | 1.2 | (0.3) | 2.6 | (0.4) | 6.9 | (0.6) |
| Foxes | 0.6 | (0.5) | 2.2 | (0.9) | 3.8 | (0.6) | 2.3 | (0.2) |
| Eagles | 1.8 | (1.2) | 1.4 | (0.5) | 5.0 | (1.3) | 4.2 | (0.3) |
| Other predators (wolves, ravens, vultures, and other animals) | 3.5 | (1.5) | 2.1 | (0.7) | 2.8 | (0.6) | 6.0 | (0.4) |
| Unknown predators | 5.1 | (2.4) | 3.0 | (0.9) | 5.1 | (0.7) | 4.4 | (0.4) |
| Total | 100.0 | | 100.0 | | 100.0 | | 100.0 | |

*Also known as cougars, pumas, and panthers.

b. Percentage of lamb crop lost by cause and by size of operation:

| Predator Cause | Percent Lamb Crop | | | | | | | |
|--|--|-------------------|--------------|-------------------|----------------|-------------------|----------------------|-------------------|
| | Size of Operation (Number of Sheep and Lambs) | | | | | | | |
| | 1-24 | | 25-99 | | 100-999 | | 1,000 or More | |
| Predator Cause | Pct. | Std. Error | Pct. | Std. Error | Pct. | Std. Error | Pct. | Std. Error |
| Bears | 0.00 | (0.00) | 0.03 | (0.01) | 0.03 | (0.00) | 0.29 | (0.02) |
| Bobcats or lynx | 0.07 | (0.06) | 0.06 | (0.02) | 0.19 | (0.02) | 0.36 | (0.02) |
| Coyotes | 2.47 | (0.53) | 1.81 | (0.24) | 2.14 | (0.16) | 2.45 | (0.09) |
| Dogs | 1.30 | (0.31) | 0.54 | (0.12) | 0.24 | (0.04) | 0.09 | (0.01) |
| Mountain lions | 0.12 | (0.06) | 0.03 | (0.01) | 0.09 | (0.01) | 0.29 | (0.03) |
| Foxes | 0.02 | (0.02) | 0.06 | (0.02) | 0.12 | (0.02) | 0.10 | (0.01) |
| Eagles | 0.08 | (0.05) | 0.04 | (0.01) | 0.16 | (0.05) | 0.18 | (0.01) |
| Other predators (wolves, ravens, vultures, and other animals) | 0.15 | (0.06) | 0.06 | (0.02) | 0.09 | (0.02) | 0.25 | (0.02) |
| Unknown predators | 0.23 | (0.11) | 0.08 | (0.02) | 0.17 | (0.02) | 0.19 | (0.02) |
| All predator causes | 4.43 | (0.65) | 2.70 | (0.32) | 3.22 | (0.22) | 4.18 | (0.11) |

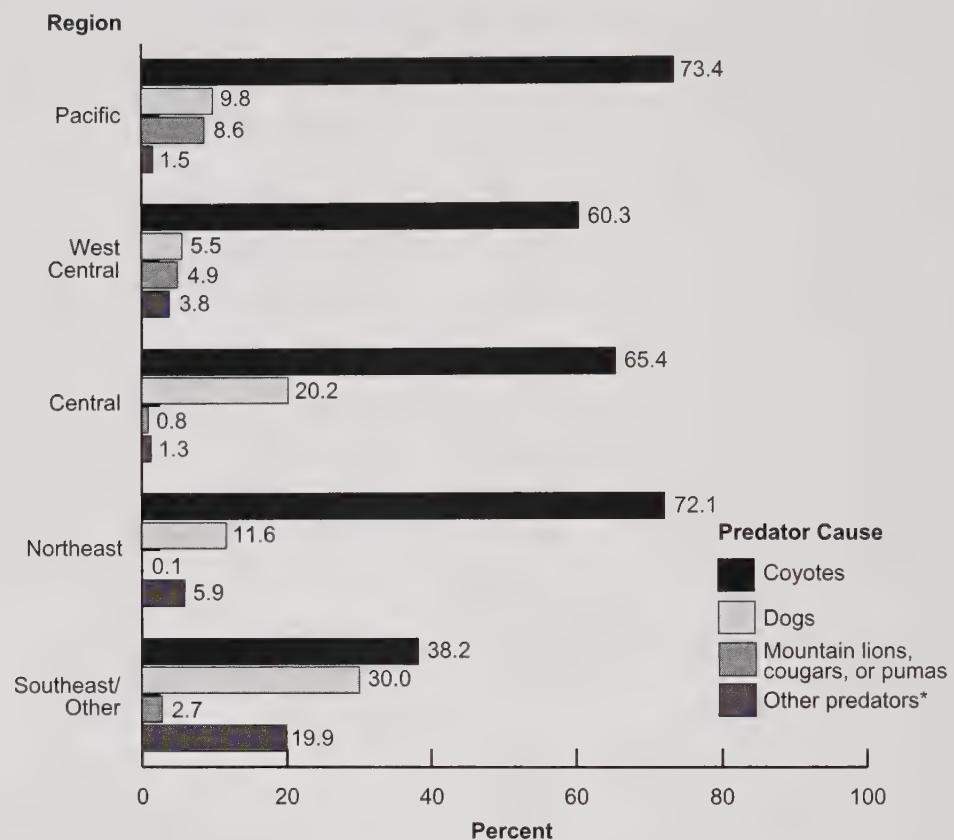
4. Cause of loss by region—2004

The percentages of lamb crop lost due to coyotes ranged from 38.2 percent in the Southeast/Other region to 73.4 percent in the Pacific region. The percentages of lamb crop lost due to dogs ranged from 30.0 percent in the Southeast/Other region to 5.5 percent in the West Central region.

a. Percentage of lamb death loss by cause and by region:

| Predator Cause | Percent Predator Loss | | | | | | | | | |
|---|-----------------------|-------|--------------|-------|-----------|-------|-----------|-------|-----------------|-------|
| | Pacific | | West Central | | Central | | Northeast | | Southeast/Other | |
| | Std. Pct. | Error | Std. Pct. | Error | Std. Pct. | Error | Std. Pct. | Error | Std. Pct. | Error |
| Bears | 2.3 | (0.8) | 4.8 | (0.4) | 0.5 | (0.4) | 1.0 | (0.3) | 0.1 | (0.0) |
| Bobcats or lynx | 0.4 | (0.1) | 8.5 | (0.5) | 1.9 | (1.0) | 0.7 | (0.6) | 0.7 | (0.4) |
| Coyotes | 73.4 | (3.4) | 60.3 | (1.4) | 65.4 | (3.3) | 72.1 | (4.9) | 38.2 | (5.5) |
| Dogs | 9.8 | (2.5) | 5.5 | (1.2) | 20.2 | (3.3) | 11.6 | (3.2) | 30.0 | (6.5) |
| Mountain lions* | 8.6 | (2.1) | 4.9 | (0.4) | 0.8 | (0.4) | 0.1 | (0.0) | 2.7 | (1.7) |
| Foxes | 0.4 | (0.1) | 3.2 | (0.4) | 1.2 | (0.2) | 0.9 | (0.3) | 3.2 | (1.9) |
| Eagles | 1.5 | (0.2) | 4.5 | (0.6) | 3.7 | (1.1) | 1.6 | (1.3) | 0.1 | (0.1) |
| Other predators (wolves, ravens, vultures, and other animals) | 1.5 | (0.4) | 3.8 | (0.4) | 1.3 | (0.5) | 5.9 | (2.1) | 19.9 | (2.5) |
| Unknown predators | 2.1 | (0.6) | 4.5 | (0.4) | 5.0 | (1.1) | 6.1 | (3.6) | 5.1 | (2.0) |
| Total | 100.0 | | 100.0 | | 100.0 | | 100.0 | | 100.0 | |

*Also known as cougars, pumas, and panthers.

Percentage of Lamb Death Loss by Cause and by Region

*Wolves, ravens, vultures, and other animals

The percentages of losses due to bears, bobcats, and eagles were substantially higher in the West Central region than in the other regions.

b. Percentage of lamb crop lost by cause and by region:

| Predator Cause | Percent Lamb Crop | | | | | | | | |
|---|-------------------|-------|--------------|-------|-------------|-------|-------------|--|-------------|
| | Pacific | | West Central | | Northeast | | | | |
| | Std. Pct. | Error | Std. Pct. | Error | Std. Pct. | Error | | | |
| Bears | 0.07 (0.03) | | 0.25 (0.02) | | 0.01 (0.01) | | 0.03 (0.01) | | 0.00 (0.00) |
| Bobcats or lynx | 0.01 (0.00) | | 0.44 (0.02) | | 0.03 (0.02) | | 0.02 (0.01) | | 0.03 (0.02) |
| Coyotes | 2.19 (0.23) | | 3.15 (0.17) | | 1.02 (0.09) | | 1.85 (0.28) | | 1.79 (0.48) |
| Dogs | 0.29 (0.08) | | 0.29 (0.07) | | 0.32 (0.06) | | 0.30 (0.09) | | 1.41 (0.48) |
| Mountain lions | 0.26 (0.07) | | 0.26 (0.02) | | 0.01 (0.01) | | 0.00 (0.00) | | 0.13 (0.08) |
| Foxes | 0.01 (0.00) | | 0.17 (0.02) | | 0.02 (0.00) | | 0.02 (0.01) | | 0.15 (0.09) |
| Eagles | 0.05 (0.01) | | 0.24 (0.04) | | 0.06 (0.02) | | 0.04 (0.03) | | 0.00 (0.00) |
| Other predators (wolves, ravens, vultures, and other animals) | 0.04 (0.01) | | 0.20 (0.02) | | 0.02 (0.01) | | 0.15 (0.05) | | 0.93 (0.19) |
| Unknown predators | 0.06 (0.02) | | 0.23 (0.02) | | 0.08 (0.02) | | 0.16 (0.10) | | 0.24 (0.11) |
| Total | 2.98 (0.26) | | 5.22 (0.22) | | 1.56 (0.12) | | 2.56 (0.33) | | 4.68 (1.06) |

C. Nonlethal Predator Control

1. Control methods

Nonlethal predator control methods were used by 31.9 percent of all operations.

a. Percentage of all operations by nonlethal predator control methods used:

| Percent Operations, 2004 | | |
|--------------------------|------|------------|
| Control Method | Pct. | Std. Error |
| Guard dogs | 10.3 | (1.0) |
| Llamas | 4.4 | (0.5) |
| Donkeys | 3.0 | (0.3) |
| Fencing | 16.6 | (1.4) |
| Lamb shed | 9.9 | (0.7) |
| Herding | 1.9 | (0.3) |
| Night penning | 10.6 | (0.8) |
| Fright tactics | 0.7 | (0.1) |
| Removing carrion | 3.9 | (0.4) |
| Culling* | 4.4 | (0.4) |
| Change bedding | 2.8 | (0.4) |
| Frequent checks | 4.5 | (0.4) |
| Other | 1.2 | (0.1) |
| Any method | 31.9 | (1.4) |

*Culling as a nonlethal strategy: Producers sometimes remove older, sick, or injured sheep from a flock for overall herd quality. In addition, it is suggested that fewer predators are attracted to the flock when these animals—which are more susceptible to predation by mountain lions, bears, and black vultures—are removed.

For operations that used nonlethal predator control methods, over half used fencing as a means of predator control in 2004. About one-third of operations that used nonlethal predator control methods used guard dogs, lamb sheds, and night penning for predator control in 2004.

b. For operations that used nonlethal predator control methods, percentage of operations by nonlethal predator control methods used:

| Control Method | Percent Operations | | |
|-----------------------|---------------------------|-------------|-------------|
| | 1994 | 1999 | 2004 |
| Guard dogs | 28.2* | 28.2 | 31.8 |
| Llamas | - | 13.2 | 14.0 |
| Donkeys | - | 9.0 | 9.1 |
| Fencing | 29.6 | 57.0 | 52.5 |
| Lamb shed | - | 46.0 | 30.8 |
| Herding | - | 6.6 | 5.7 |
| Night penning | - | 42.6 | 32.9 |
| Fright tactics | 7.2 | 5.1 | 2.2 |
| Removing carrion | - | - | 11.7 |
| Culling | - | - | 13.8 |
| Change bedding | - | - | 8.9 |
| Frequent checks | - | - | 14.0 |
| Husbandry | 29.6 | - | - |
| Other | 4.7 | 6.2 | 3.8 |

*In 1994 this category was guard animals.

c. For operations that used nonlethal predator control methods, percentage of operations by number of nonlethal predator control methods used:

| Number of Control Methods Used | Percent Operations | Std. Error |
|--------------------------------|--------------------|------------|
| 1 | 43.8 | (2.8) |
| 2 | 24.2 | (1.9) |
| 3 | 11.1 | (1.4) |
| 4 | 9.3 | (1.5) |
| 5 | 5.0 | (0.8) |
| 6 | 3.5 | (0.7) |
| 7 or more | 3.1 | (0.3) |
| Total | 100.0 | |

For operations that used nonlethal predator control methods, the West Central region had the lowest percentage of operations (38.4 percent) that used fencing for predator control. Guard dogs, lamb sheds, and night penning were used by similar percentages of operations across regions.

d. For operations that used nonlethal predator control methods, percentage of operations by control method and by region:

| Control Method | Percent Operations | | | | | | | | | |
|------------------|--------------------|-------|--------------|-------|-----------|-------|-----------|-------|-----------------|-------|
| | Pacific | | West Central | | Central | | Northeast | | Southeast/Other | |
| | Std. Pct. | Error | Std. Pct. | Error | Std. Pct. | Error | Std. Pct. | Error | Std. Pct. | Error |
| Guard dogs | 26.5 | (4.2) | 34.8 | (3.4) | 27.5 | (2.9) | 38.4 | (8.3) | 39.1 | (6.8) |
| Llamas | 15.0 | (4.1) | 19.8 | (3.3) | 13.2 | (1.9) | 12.0 | (4.0) | 7.1 | (3.0) |
| Donkeys | 6.9 | (2.1) | 13.8 | (2.5) | 7.0 | (1.2) | 7.2 | (1.6) | 19.3 | (4.3) |
| Fencing | 62.6 | (5.3) | 38.4 | (3.5) | 47.4 | (4.8) | 61.3 | (7.8) | 60.4 | (5.4) |
| Lamb shed | 40.5 | (5.6) | 27.8 | (3.0) | 32.6 | (3.4) | 27.4 | (5.0) | 26.3 | (6.0) |
| Herding | 6.1 | (1.6) | 8.2 | (1.7) | 4.2 | (0.7) | 7.3 | (3.0) | 2.7 | (0.8) |
| Night penning | 37.7 | (4.9) | 34.0 | (3.4) | 33.8 | (3.4) | 33.3 | (5.4) | 22.9 | (4.8) |
| Fright tactics | 3.6 | (0.9) | 3.0 | (0.5) | 1.9 | (0.4) | 1.4 | (0.5) | 1.9 | (0.9) |
| Removing carrion | 22.4 | (4.5) | 13.4 | (2.5) | 12.6 | (1.6) | 5.0 | (1.2) | 11.3 | (4.7) |
| Culling | 19.9 | (4.2) | 17.6 | (2.7) | 14.9 | (1.7) | 9.3 | (2.9) | 4.9 | (1.3) |
| Change bedding | 9.5 | (1.7) | 9.7 | (1.4) | 7.0 | (1.2) | 10.4 | (4.5) | 7.3 | (2.1) |
| Frequent checks | 19.9 | (3.5) | 18.8 | (2.1) | 11.1 | (1.7) | 12.9 | (3.6) | 8.3 | (1.7) |
| Other | 2.1 | (0.7) | 3.7 | (0.8) | 4.8 | (0.8) | 3.6 | (1.0) | 4.6 | (1.9) |

For operations that used nonlethal predator control methods, the percentages of operations that used fencing as a means of predator control ranged from 58.1 percent of operations with 1 to 24 sheep and lambs to 38.3 and 38.5 percent of operations with 100-999 and 1,000 or more sheep and lambs, respectively. A higher percentage of operations with 1,000 or more sheep and lambs used guard dogs compared to the other operation sizes.

e. For operations that used nonlethal predator control methods, percentage of operations by control method and by size of operation:

| Control Method | Percent Operations | | | | | | | | All Operations Std. Error | |
|------------------|--------------------|------------|-------|------------|---------|------------|---------------|------------|------------------------------|--|
| | 1-24 | | 25-99 | | 100-999 | | 1,000 or More | | | |
| | Pct. | Std. Error | Pct. | Std. Error | Pct. | Std. Error | Pct. | Std. Error | | |
| Guard dogs | 32.5 | (4.2) | 28.1 | (2.2) | 40.4 | (3.4) | 56.4 | (1.4) | 32.3 (2.7) | |
| Llamas | 11.2 | (2.1) | 17.5 | (2.5) | 20.5 | (1.7) | 21.2 | (1.0) | 14.0 (1.5) | |
| Donkeys | 8.1 | (1.3) | 10.0 | (1.6) | 16.5 | (1.9) | 10.2 | (0.7) | 9.5 (0.9) | |
| Fencing | 58.1 | (4.1) | 44.9 | (2.8) | 38.3 | (3.5) | 38.5 | (1.4) | 52.2 (2.8) | |
| Lamb shed | 29.5 | (2.8) | 35.5 | (2.7) | 29.5 | (2.0) | 23.8 | (1.0) | 31.1 (2.0) | |
| Herd ing | 4.6 | (1.1) | 6.9 | (1.1) | 7.9 | (0.9) | 29.9 | (1.1) | 5.9 (0.9) | |
| Night penning | 32.2 | (3.0) | 37.1 | (2.9) | 31.1 | (2.1) | 21.8 | (1.2) | 33.4 (2.0) | |
| Fright tactics | 1.4 | (0.3) | 2.9 | (0.5) | 4.7 | (0.7) | 11.9 | (0.8) | 2.3 (0.3) | |
| Removing carrion | 9.4 | (1.5) | 16.1 | (2.2) | 17.5 | (1.5) | 20.8 | (1.0) | 12.2 (1.2) | |
| Culling | 8.0 | (1.4) | 22.1 | (2.4) | 25.6 | (1.8) | 34.0 | (1.2) | 14.0 (1.3) | |
| Change bedding | 7.4 | (1.9) | 9.6 | (1.4) | 12.5 | (1.1) | 26.2 | (1.0) | 8.7 (1.2) | |
| Frequent checks | 11.2 | (1.8) | 17.1 | (1.8) | 20.6 | (1.5) | 36.2 | (1.3) | 14.1 (1.3) | |
| Other | 2.8 | (0.5) | 5.5 | (0.9) | 6.0 | (0.6) | 8.3 | (1.0) | 3.9 (0.4) | |

Section III: Methodology

A. 1994 Death Loss Study

1. Survey procedures

A random sample of U.S. producers was surveyed by NASS to provide data for these estimates. Survey procedures ensured that all producers (except those in Alaska) had an opportunity to be included in the survey, regardless of operation size. Data were collected from approximately 75,000 cattle and sheep producers during the first half of January by mail, telephone, and face-to-face interviews. Large operations were sampled more heavily than small operations. An additional nonprobability survey was also conducted in a few western States. Regardless of when producers responded, they were asked to report death losses for sheep and lambs for the 1994 calendar year. Based on the original data collected during January, a report entitled "Sheep and Goats Predator Loss" was issued April 27, 1995. This report contained data for death loss by cause for predators only and was on a State and regional level. Value of the losses was also included.

2. Estimation procedures

Total sheep and lamb death losses from all causes were published in the "Meat Animals, Production, Disposition, and Income—1994" report (released April 13, 1995). In setting the estimates for the report, total predator and nonpredator losses were estimated as a percentage of total losses set previously, and specific predator and nonpredator losses were estimated as a percentage of total predator and nonpredator losses, respectively.

3. Reliability

Since all sheep producers were not included in the sample, survey estimates are subject to sampling variability. Survey results are also subject to nonsampling errors, such as omissions, duplications, and mistakes in reporting, recording, and data processing. The effects of these nonsampling errors cannot be measured directly. They are minimized through rigid quality controls in the data collection process and through a careful review of all reported data for consistency and reasonableness.

B. 1999 Death Loss Study

1. Survey procedures

A random sample of U.S. producers was surveyed by NASS to provide data for these estimates. Survey procedures ensured that all sheep producers, regardless of operation size, had an opportunity to be included in the survey. Large operations were sampled more heavily than small operations. About 13,800 producers were contacted during the first half of January by mail, telephone, and face-to-face interviews.

2. Estimation procedures

Total death losses from all causes for sheep and lambs were as reported in “Meat Animals, Production, Disposition, and Income—2000” report (released April 27, 2001).

In setting the predator loss estimates, total predator losses were estimated as a percentage of total losses, and specific predator losses were estimated as a percentage of total predator losses. The “Sheep and Goats Predator Loss” report was published May 5, 2000, by NASS. Nonpredator loss percentages by cause of loss were generated by APHIS based upon analysis of the data collected in January 1999.

3. Revision policy

Revisions to previous estimates of total death losses are made to improve the current estimate. Previous-year estimates are subject to revision when current estimates are made. Estimates for losses from all causes are subject to revision in the following year’s “Meat Animals, Production, Disposition, and Income” report.

C. 2004 Death Loss Study**1. Survey procedures**

A random sample of U.S. producers was surveyed by NASS to provide data for these estimates. Survey procedures ensured that all sheep producers, regardless of operation size, had an opportunity to be included in the survey. Large operations were sampled more heavily than small operations. About 22,000 operators were contacted during the first half of January 2005 by mail, telephone, and face-to-face interviews.

2. Estimation procedures

Total death losses from all causes for sheep and lambs were as reported in "Meat Animals, Production, Disposition, and Income—2004" report (released April 28, 2005). In setting the predator and nonpredator loss estimates, total predator and nonpredator losses were estimated as a percentage of total losses, then specific predator and nonpredator losses were estimated as a percentage of total predator and nonpredator losses. Death losses by predator and nonpredator cause of loss were published in the "Sheep and Goats Death Loss" report (released May 6, 2005).

Nonpredator cause of loss percentages by cause of loss, region, and operation were generated by APHIS based upon analysis of the data collected in January 2005.

3. Revision policy

Revisions to previous estimates of total death losses are made to improve the current estimate. Previous-year estimates are subject to revision when current estimates are made. Estimates for losses from all causes are subject to revision in the following year's "Meat Animals, Production, Disposition, and Income" report.

Appendix: Discussion of Pre- and Postdocking Losses

In the Western States (Arizona, California, Colorado, Idaho, Oregon, Montana, New Mexico, Nevada, Texas, Utah, Washington, Wyoming) NASS defines lamb crop as lambs marked, docked, or branded. These States make up the Pacific and West Central regions in this report. In the remaining States, lamb crop is defined as lambs born. The individual State versions of the January 1 Sheep and Goats Survey questionnaire reflect these differences.

For the States in the Pacific and West Central regions listed above, NASS reports* only lamb losses that occurred after marking, docking, or branding. However, the questionnaire used in the Pacific and West Central States did include a question regarding lambs lost before marking, docking, or branding. Five States (Colorado, Utah, Wyoming, Idaho, and Montana) publish State-level losses separated into pre- and postdocking. These States also conduct cause-of-loss surveys on an annual or biannual basis and publish the results.

The exclusion of predocking losses from the two reports is due to the fact that lambs in the Pacific and West Central regions are usually born on range and, therefore, less likely to be observed. It is difficult for producers in these regions to accurately estimate the number of lambs both born and lost before marking, docking, or branding. However, this method leads to the exclusion of a large number of losses. In addition, no lambs lost due to lambing problems are counted in these States, as these losses would obviously all occur in the predocking period. Examination of the published predocking losses in the five States provides an estimate of the magnitude of losses that occur before docking (see table a).

With the exception of Colorado, over half of all reported lamb losses in each of the five States occurred in the predocking period. In Colorado, only about one-third of all losses (32.1 percent) occurred predocking. The percentage of total predator losses that occurred in the predocking period (table b) ranged from 20.0 percent in Idaho to 48.1 percent in Wyoming. For nonpredator losses (table c), Idaho, Montana, Utah, and Wyoming show at least two-thirds of reported nonpredator losses occurred in the predocking period, while in Colorado, 26.1 percent of nonpredator losses occurred in the predocking period.

* NASS publications: "Meat Animals, Production, Disposition, and Income" (April) and the periodic published in May approximately every 5 years "Sheep and Goats Death Loss."

a. Number of postdocking lamb losses, predocking lamb losses, and predocking lamb losses as a percentage of total lamb losses, by State, 2004:

| Number of Lamb Losses | | | | |
|------------------------------|--|--|--------------|--|
| State | Postdocking NASS Reported | Predocking State Reported | Total | Predocking Losses as a Percentage of Total Losses |
| Colorado | 19,000 | 9,000 | 28,000 | 32.1 |
| Idaho | 12,000 | 13,000 | 25,000 | 52.0 |
| Montana | 14,000 | 17,000 | 31,000 | 54.8 |
| Utah | 18,000 | 19,800 | 37,800 | 52.4 |
| Wyoming | 18,000 | 26,000 | 44,000 | 59.1 |

b. Number of postdocking predator lamb losses, predocking predator lamb losses, and predocking predator lamb losses as a percentage of total predator lamb losses, by State, 2004:

| Number of Predator Lamb Losses | | | | |
|---------------------------------------|--|--------------------------------------|--------------|--|
| State | Postdocking NASS Reported | Predocking State Reported | Total | Predocking Losses as a Percentage of Total Losses |
| Colorado | 8,000 | 5,100 | 13,100 | 38.9 |
| Idaho | 6,800 | 1,700 | 8,500 | 20.0 |
| Montana | 7,900 | 2,900 | 10,800 | 26.9 |
| Utah | 14,800 | 9,800 | 24,600 | 39.8 |
| Wyoming | 14,000 | 13,000 | 27,000 | 48.1 |

c. Number of postdocking nonpredator lamb losses, predocking nonpredator lamb losses, and predocking nonpredator lamb losses as a percentage of total nonpredator lamb losses, by State, 2004:

| Number of Nonpredator Lamb Losses | | | | |
|--|--|--|--------------|--|
| State | Postdocking NASS Reported | Predocking State Reported | Total | Predocking Losses as a Percentage of Total Losses |
| Colorado | 11,000 | 3,900 | 14,900 | 26.2 |
| Idaho | 5,200 | 11,300 | 16,500 | 68.5 |
| Montana | 6,100 | 14,100 | 20,200 | 69.8 |
| Utah | 3,200 | 10,000 | 13,200 | 75.8 |
| Wyoming | 4,000 | 13,000 | 17,000 | 76.4 |



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